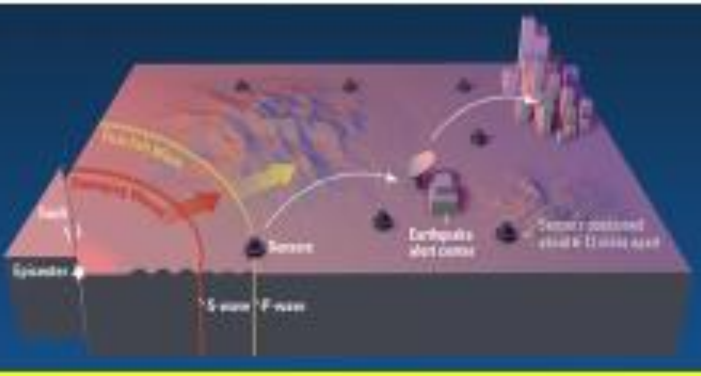
2019 COMMUNICATIONS ACADEMY

"COMMUNICATIONS RESPONSE TO CASTROPHIC EVENTS"

ShakeAlert™



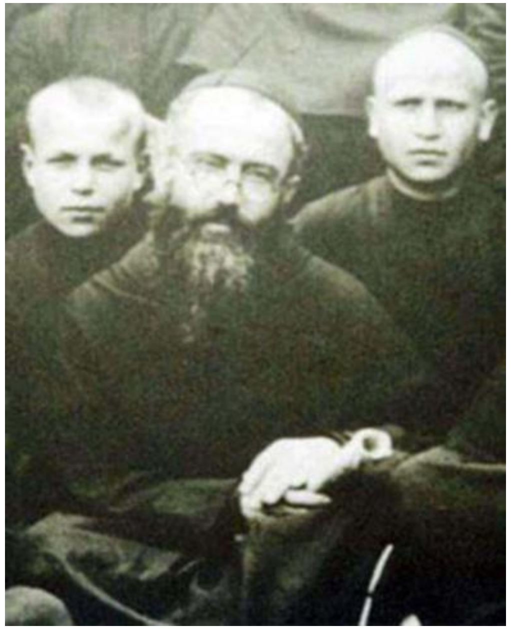
An Earthquake Early Warning System for the West Coast of the United States

April 13, 2019

Chuck Wallace, WA State ShakeAlert Earthquake Early Warning Coordinator
Cascadia Region Earthquake Workgroup

Fr. Maximilian Kolbe

In 1927, he established an evangelization center near Warsaw called Niepokalanow, the “City of the Immaculata.” By 1939, the City had expanded from eighteen friars to an incredible 650, making it the largest Catholic religious house in the world.



To better “win the world for the Immaculata,” the friars utilized the most modern printing and administrative techniques. This enabled them to publish countless catechetical and devotional tracts, a daily newspaper with a circulation of 230,000 and a monthly magazine with a circulation of over one million. Maximilian started a **shortwave radio station** and planned to build a motion picture studio–he was a true “apostle of the mass media.”

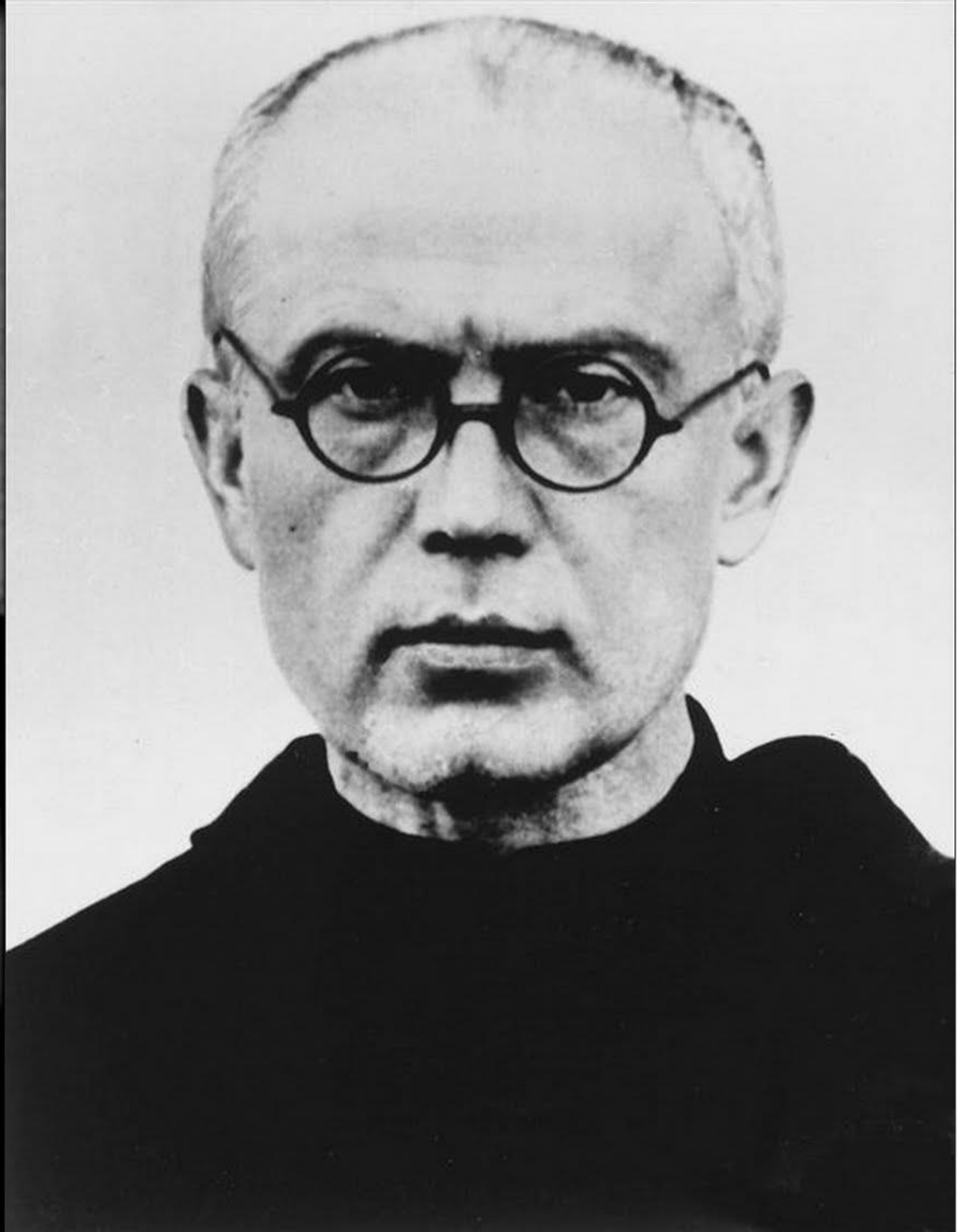
Massimiliano Kolbe

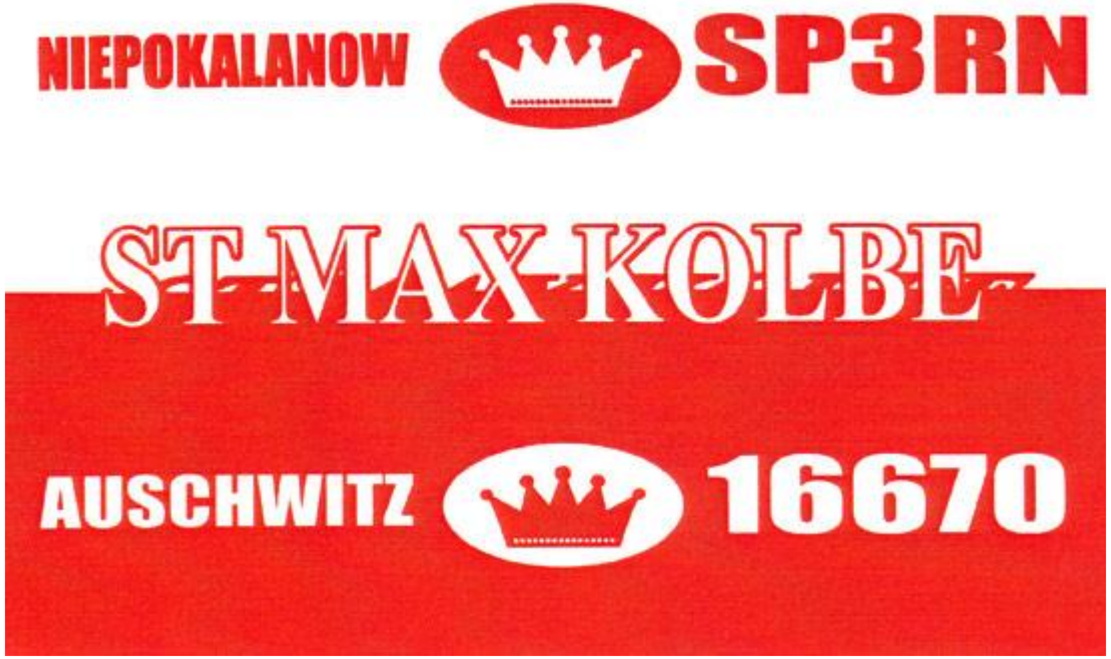
Matr. 16670

Radioamatore

SP3RN

Santo




NIEPOKALANOW SP3RN

ST MAX KOLBE

AUSCHWITZ 16670

St. Maximilian Kolbe
Patron Saint of Amateur Radio Operators

Stacja Polska 3 Radio Niepokalanów (SP3RN)

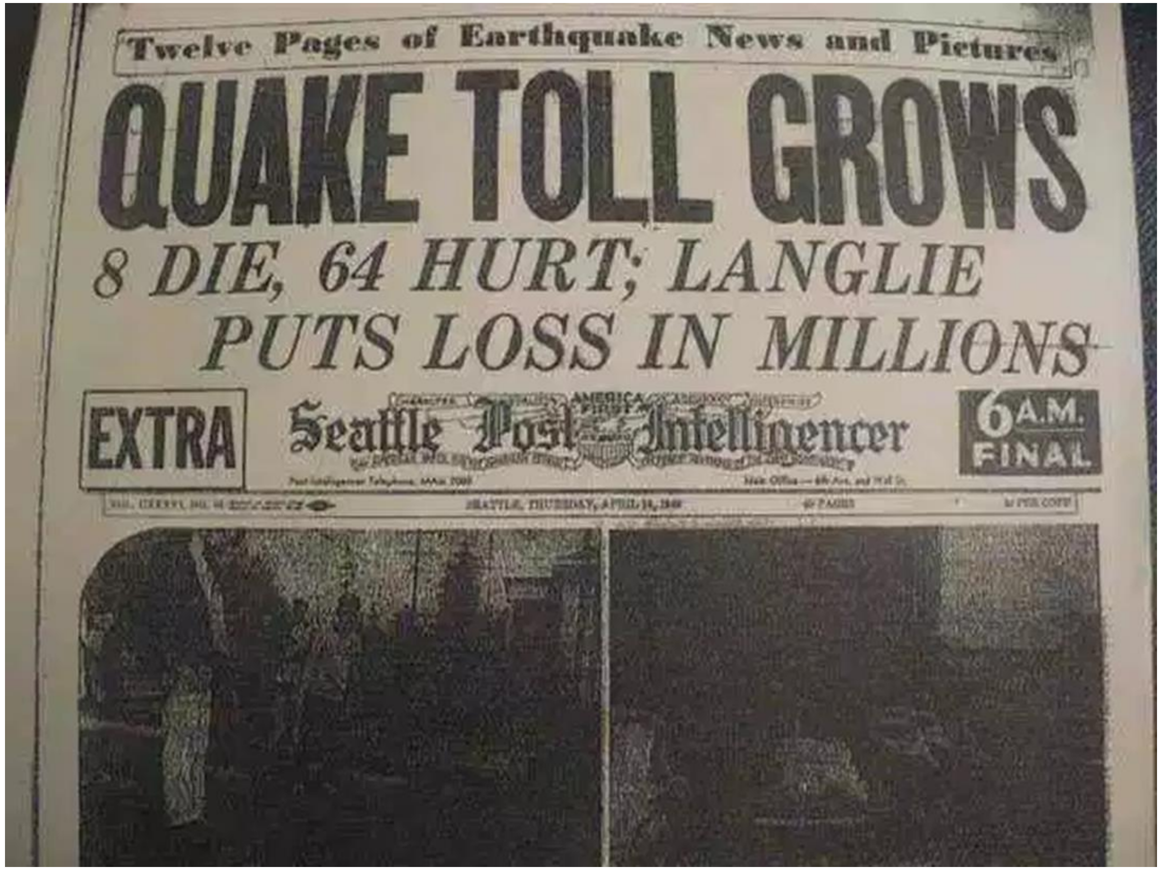
(TRZY – Che)

Canonized in 1982 by Pope John Paul II

Does Anyone Know the Historical Significance of Today's Date, (April 13th), in Washington State Disaster History?

shutterstock.com • 1185366616

Commemorate 70 years since



Twelve Pages of Earthquake News and Pictures

QUAKE TOLL GROWS

8 DIE, 64 HURT; LANGLIE PUTS LOSS IN MILLIONS

EXTRA

Seattle Post-Intelligencer

AMERICA FIRST

6 A.M. FINAL

1949 Olympia Earthquake

1949 Olympia Earthquake

Wednesday, April 13, 1949 11:55am Magnitude 6.7

Mercalli Scale VIII (Severe) 20 second duration

1949 Olympia Earthquake

Centralia – 40% of homes and businesses reported damage.

10,000 chimneys needed repair in Western Washington

All large buildings in Olympia reported damages.

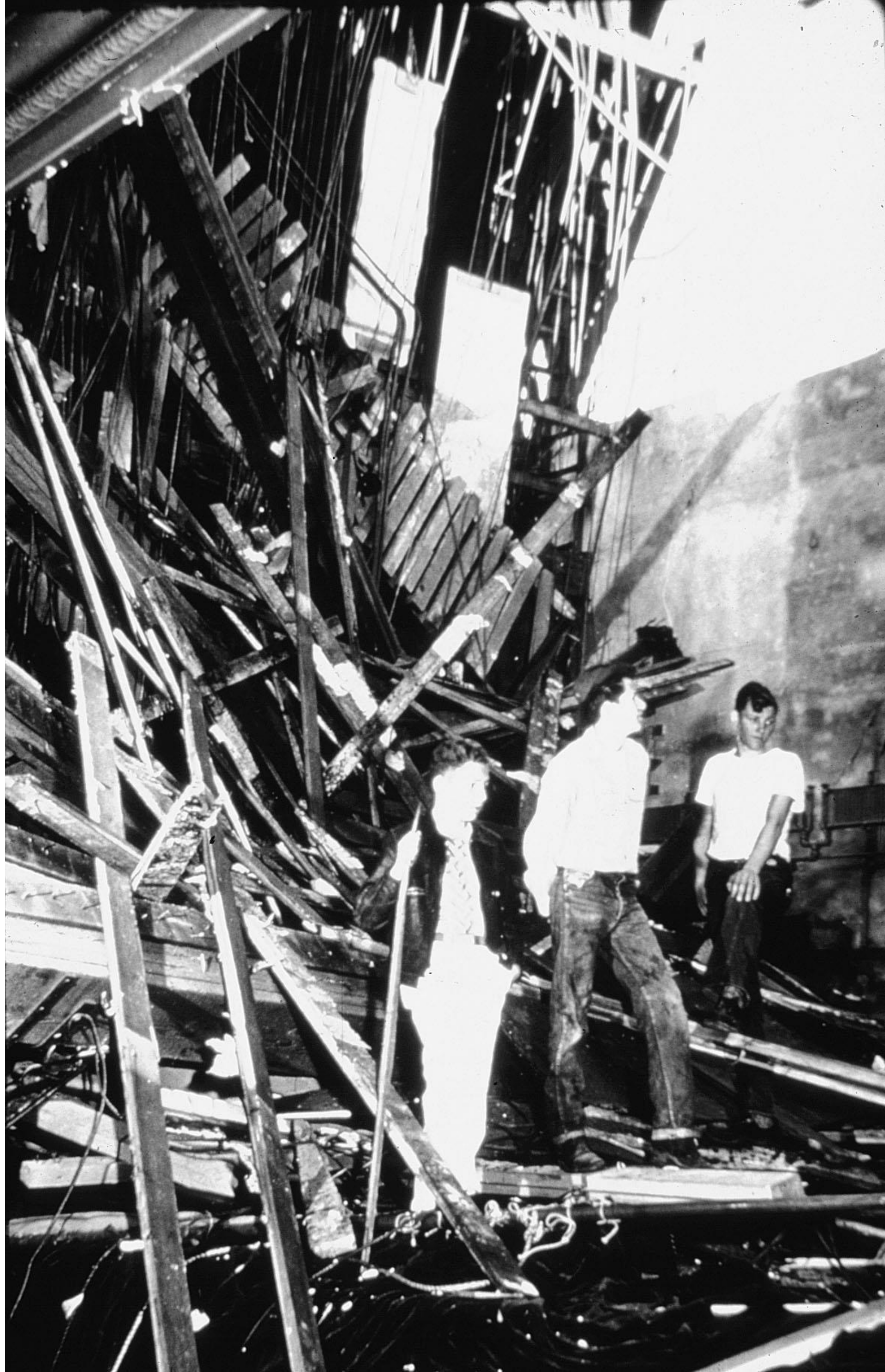
Ground water from liquefaction flooded much of Puyallup.

Boeing Plants on Renton & SW Seattle sustained significant damage.

In Tacoma, a 200’ cliff fell into the Puget Sound 3 days later, causing a tsunami which reflected back into Tacoma across the Tacoma Narrows. Numerous homes along the waterfront sustained damages.

$25 million in damages ($261 million in 2019 dollars)

Fortunately, many school districts, in and around Seattle, were on spring break at the time or the casualties might have been greater.



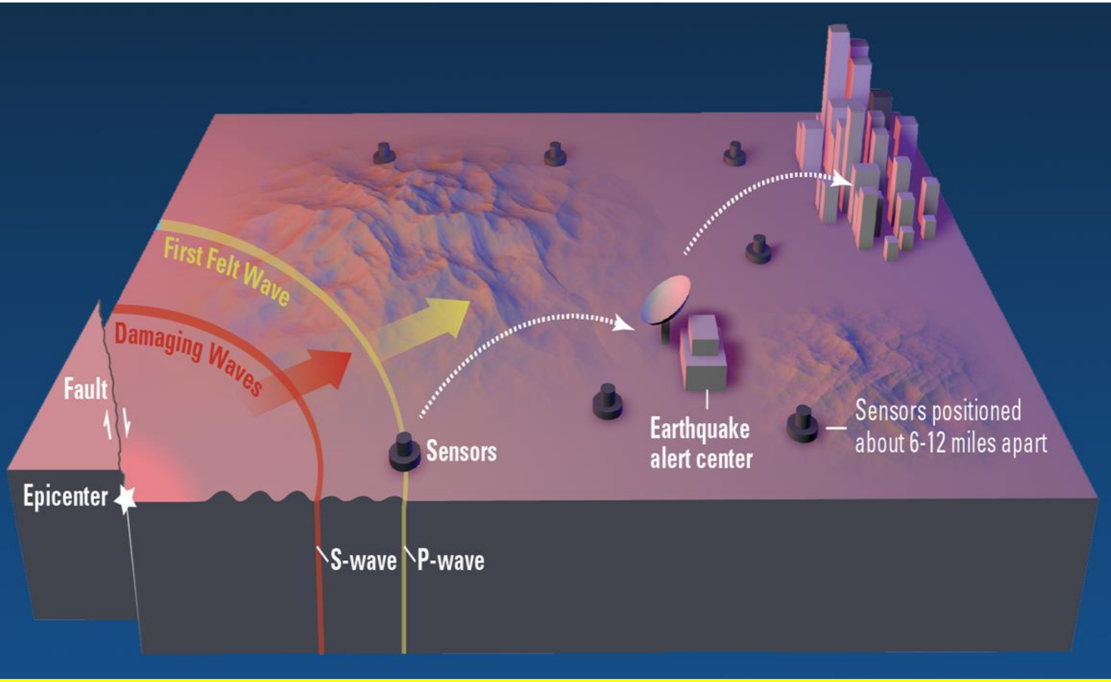
Open air theatre—Three members of the stage crew at Puyallup High School survey the wreckage of the stage, which was caved in by the earthquake just as they were leaving for lunch. Under the debris are a ping-pong table and a grand piano.

1949 Olympia Earthquake

At Castle Rock High School, falling masonry killed the student body president as he tried to escape from the building . Another student was killed by falling bricks at Lowell Grammar School in Tacoma. In all, thirty schools were damaged in this earthquake. This earthquake eventually led to enactment of RCW 70.86 in 1955, which established “Earthquake Standards for Construction” and required that all schools and other high-occupancy buildings be “designed and constructed to withstand probable earthquake intensities at the location thereof”. This standard was strengthened in 1974 when the Washington State Legislature passed RCW 19.27, the State Building Code Act, which incorporated the more stringent standards of the Uniform Building Code.

WA State School Seismic Safety Project, 2011 - Walsh & Schelling

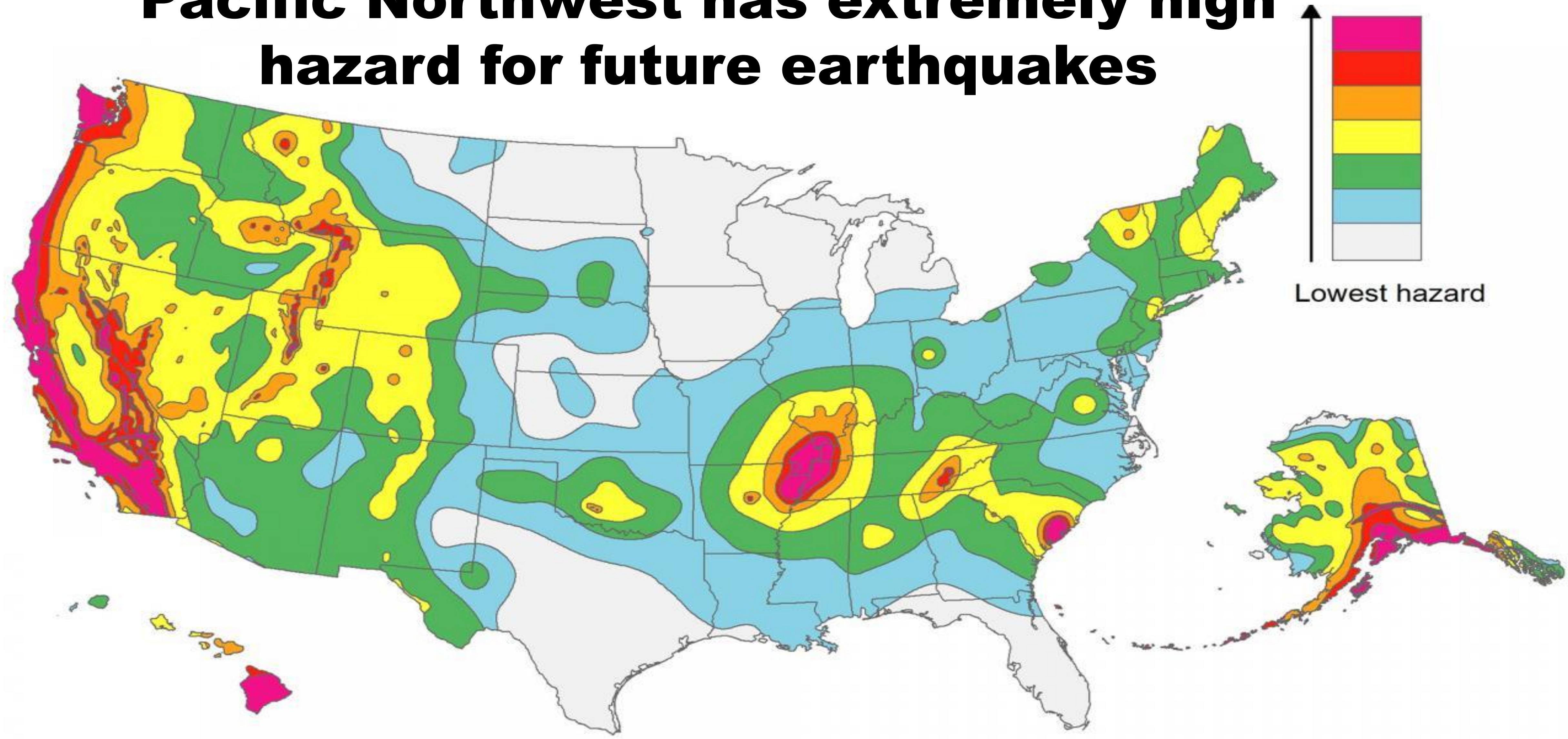
ShakeAlert™



An Earthquake Early Warning System for the West Coast of the United States

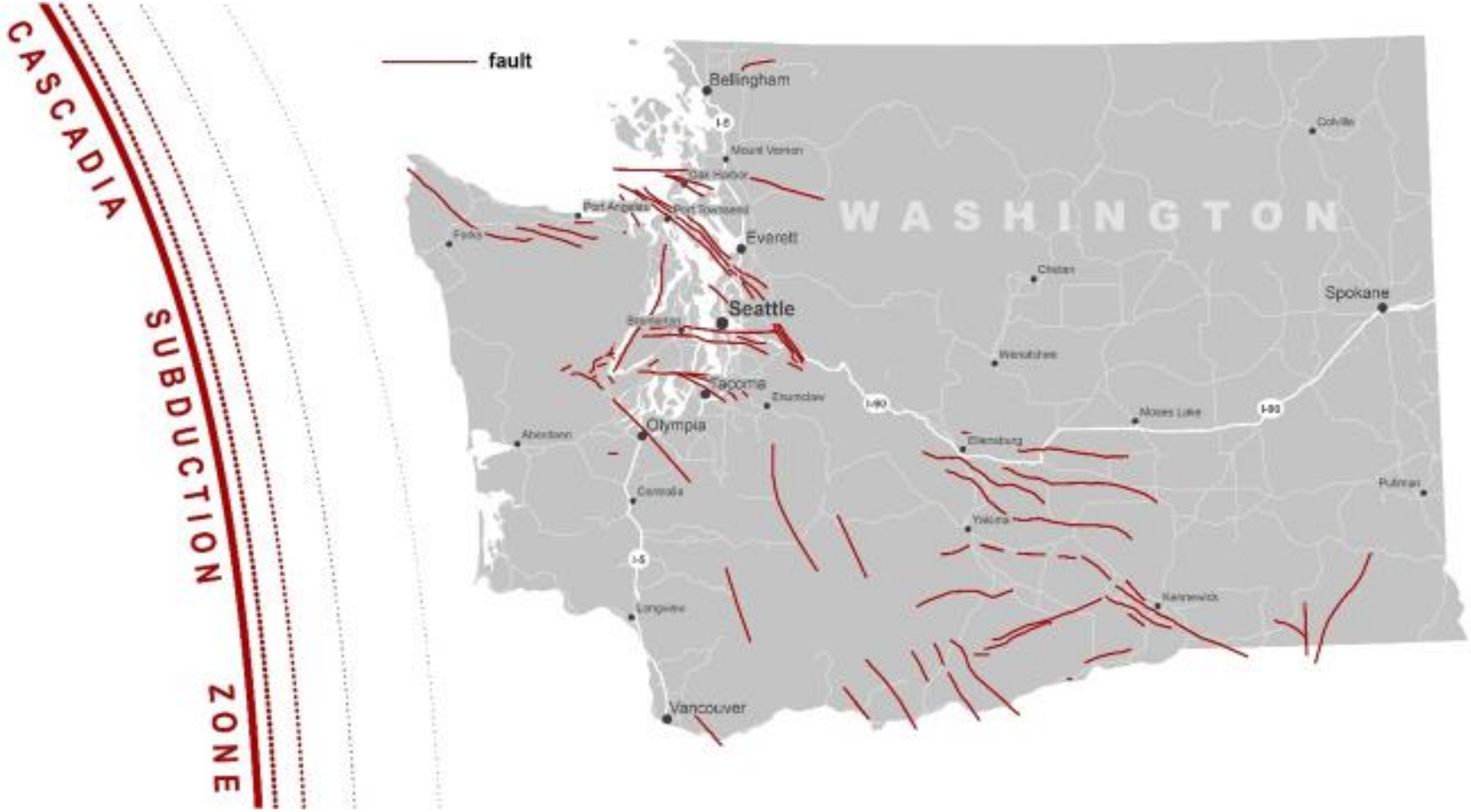
Why?

Pacific Northwest has extremely high hazard for future earthquakes



Seismic Hazard – Determined by the frequency and force of its earthquakes

Washington State Ranks 2nd in Seismic Risk in U.S.

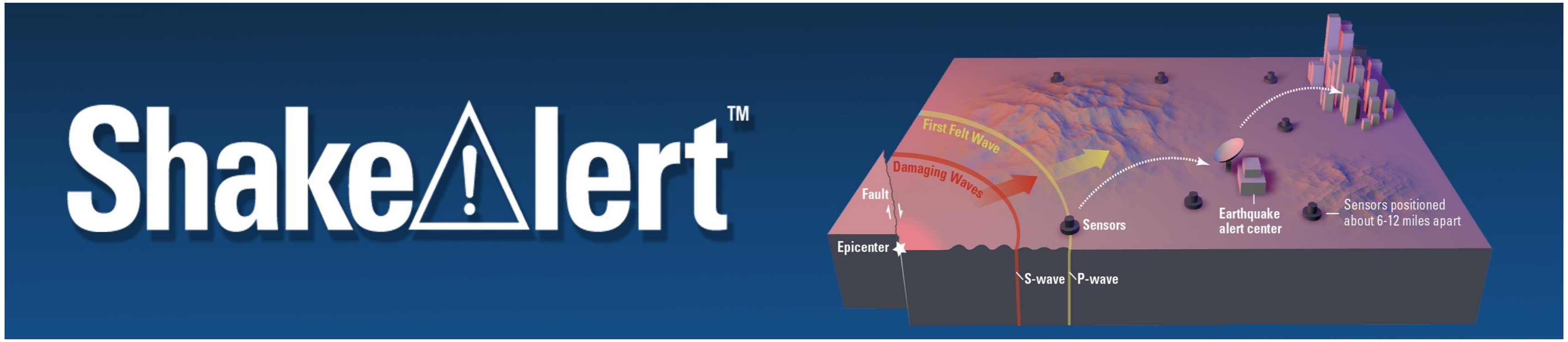


Seismic Risk – Based in terms of number of victims, damage to buildings and direct and indirect costs expected after an earthquake

Victim does not necessarily imply injury or death. They may have lost a job, or home, personal belongings.

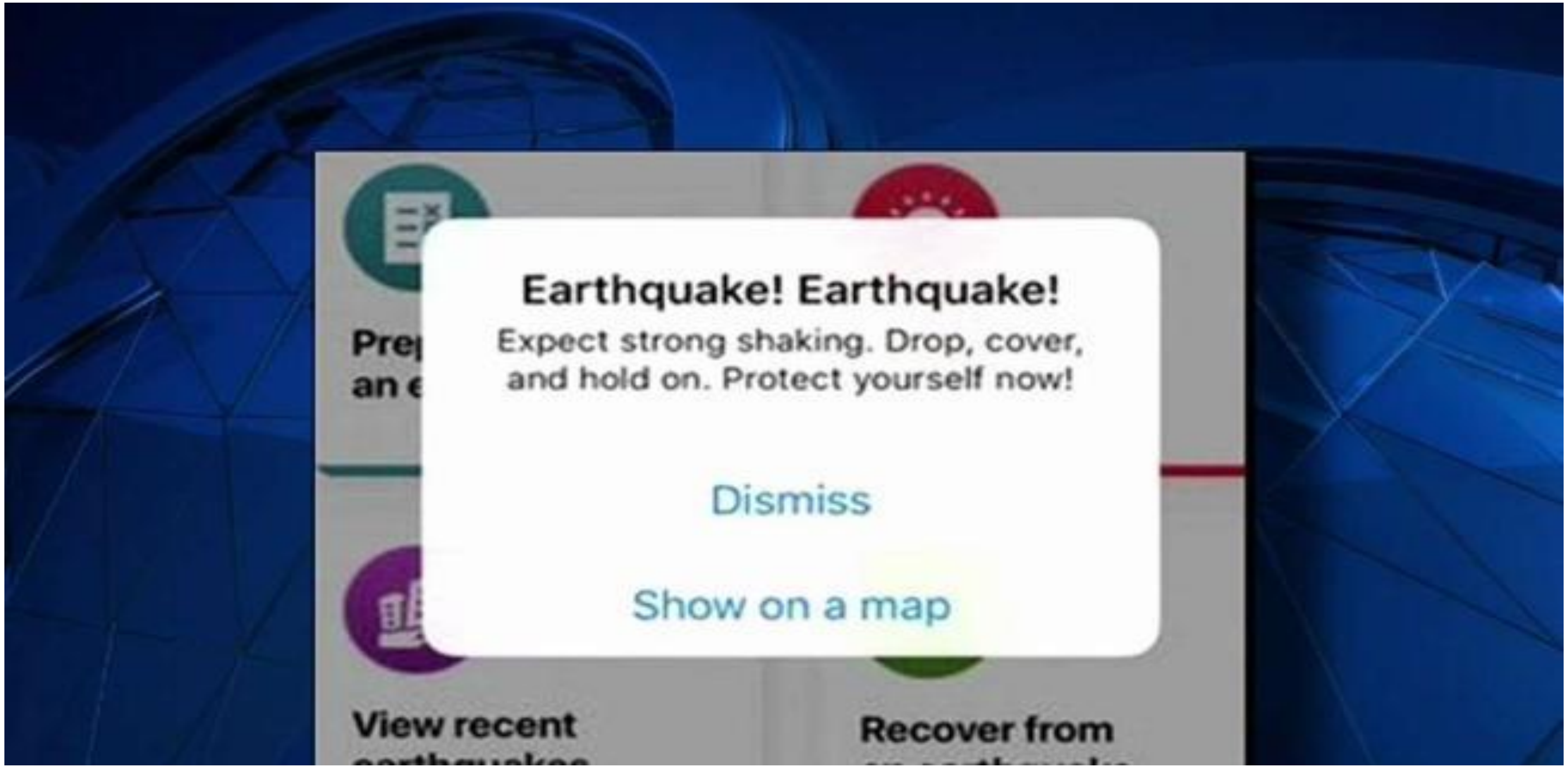
Priorities in a Disaster

Protect Life, Property, Environment and the Economic Vitality of the Community, and Business/Entity



What If?

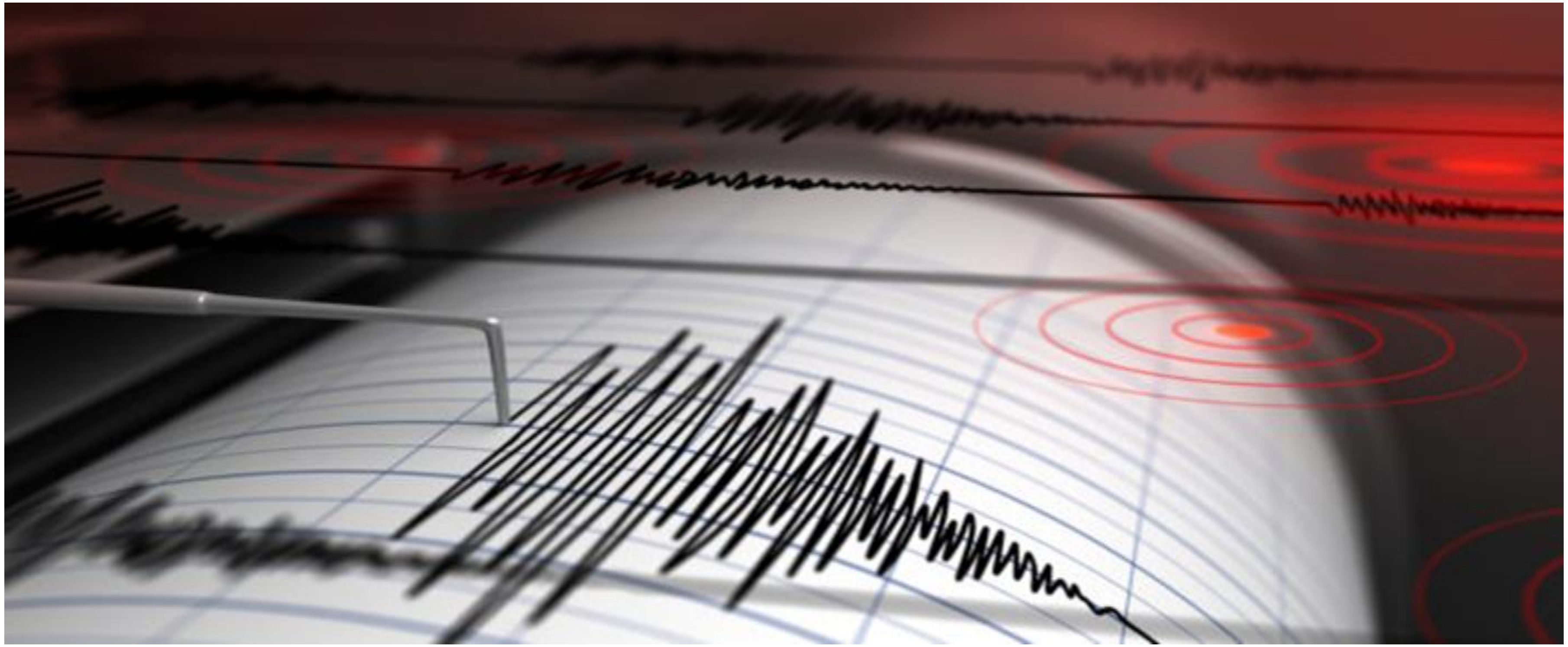
What if there was a way to tell you an earthquake has occurred …



Earthquake! Earthquake!

Expect strong shaking. Drop, cover, and hold on. Protect yourself now!

BEFORE the shaking started?



Elevators

Elevators Return to Closest Floor

Elevator Damage w/Possible Injury to Occupants

Schools

School Safety
Drop, Cover, Hold on

School and Classroom Damage w/Possible Injury to Students

Transit

Automatic Braking Systems

Speed Reduced Passenger Safety Enhanced

Industrial Sites

Automatic & Pneumatic Activated Industrial Shut off Valves

Avoid a Disaster within a Disaster

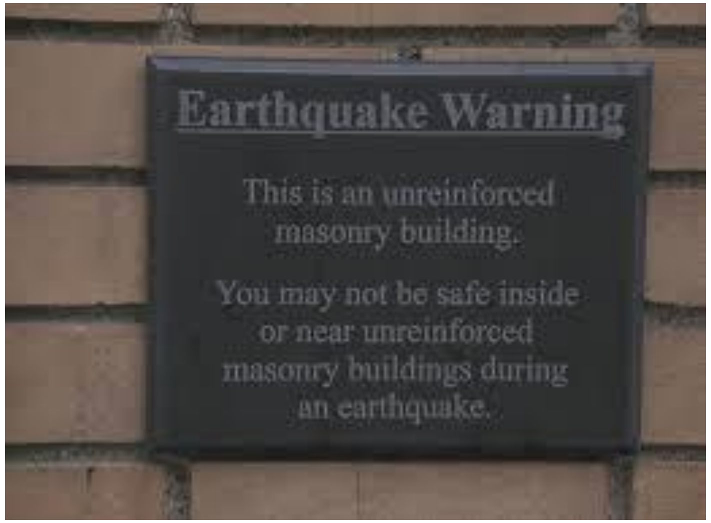
Bridges

Bridge Closure Gates

Prevent Casualties due to Collapse

Unreinforced Masonry Buildings

Public Information and Training on Recognition of URM Buildings



Earthquake Warning

This is an unreinforced masonry building.

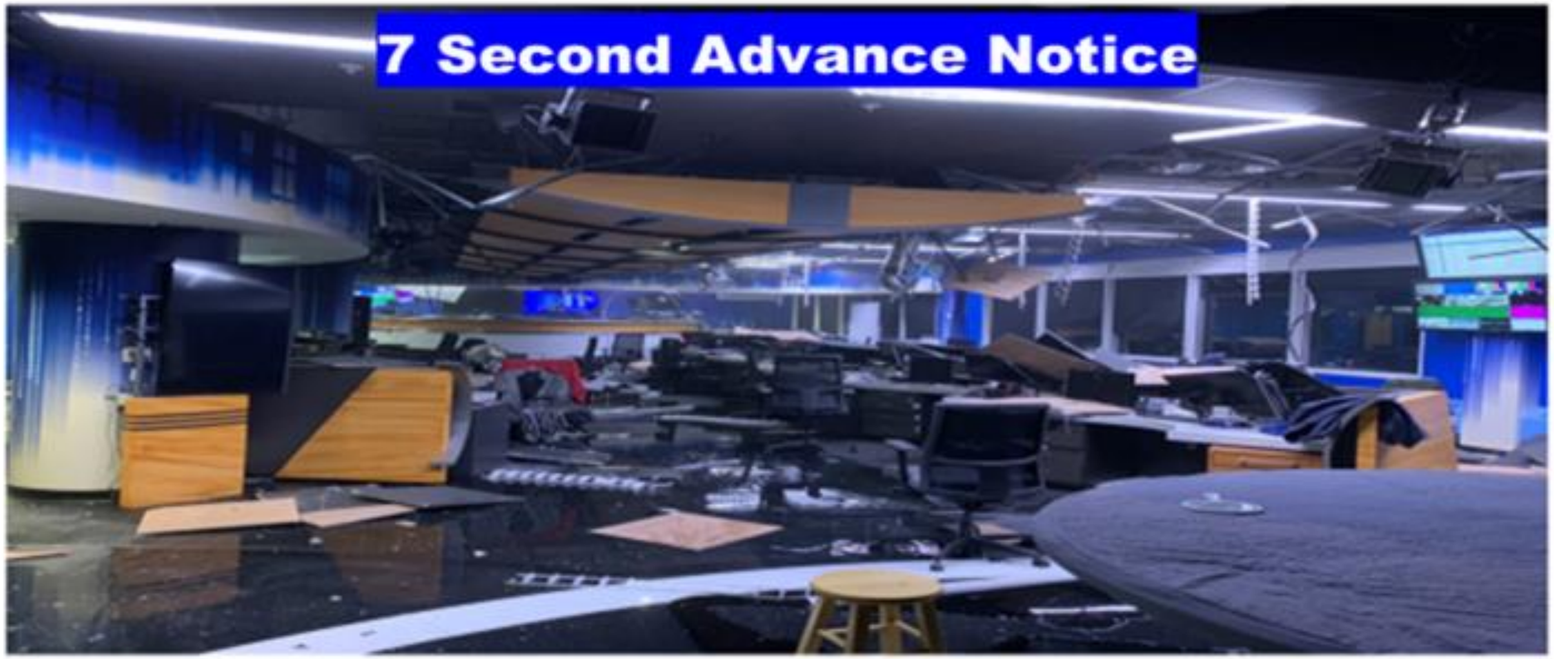
You may not be safe inside or near unreinforced masonry buildings during an earthquake.

Drop, Cover and Hold on Procedures Followed Reducing Possible Casualties

What if …

- You could receive outreach, training and assistance on Protective Measures to take, following receipt of an Earthquake Early Warning, on what to do prior to and during an Earthquake?

Magnitude 7.0 Alaska Earthquake
KTVA Newsroom 11/30/2018



Cassie Schirm

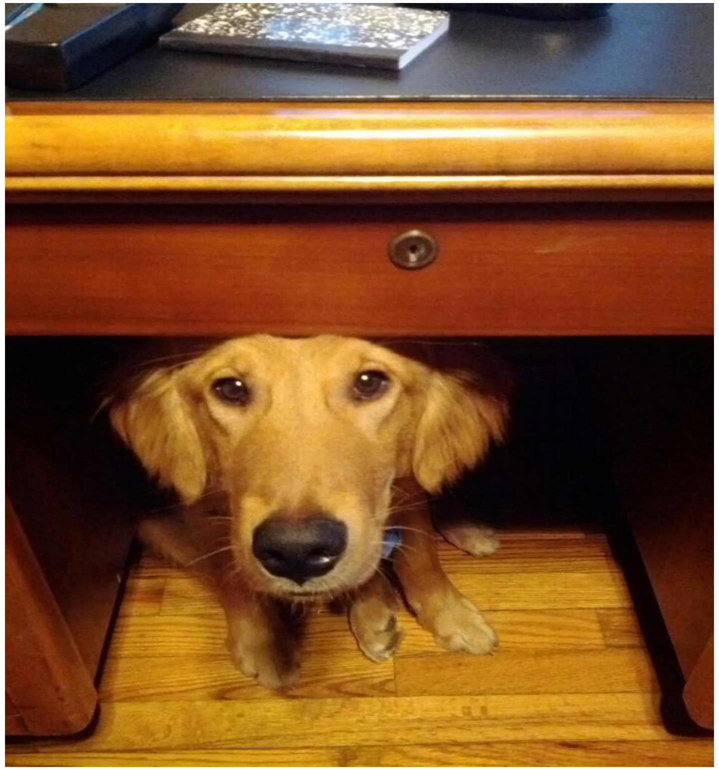
According to OSHA ...

Ground movement during an earthquake is seldom the direct cause of death or injury.

According to OSHA …

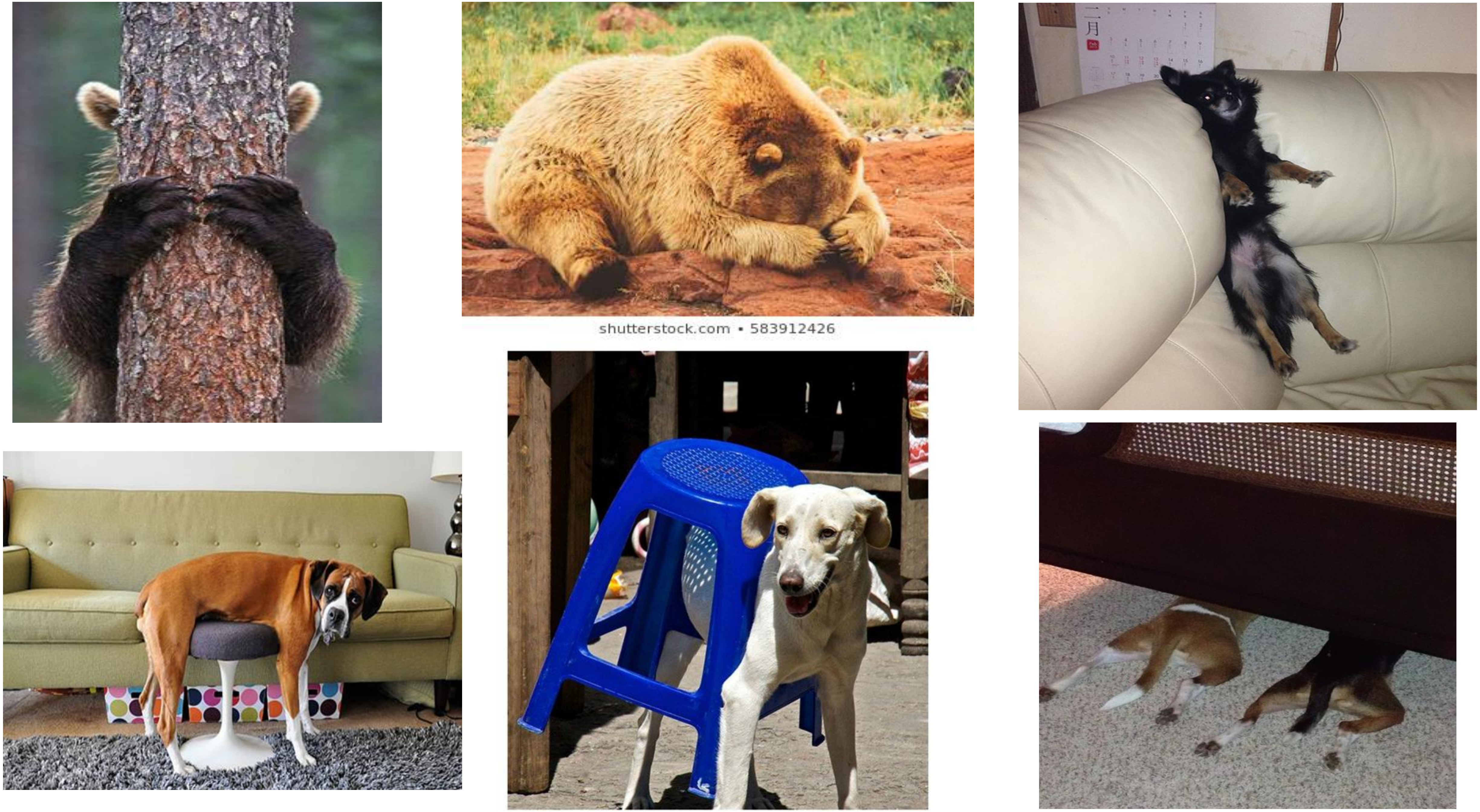
Most earthquake related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking.

04/16/2016 Ecuador



Some Say Animals Can Tell When an Earthquake is Going to Occur!

And, they can help you figure out what to do in order to protect yourself before the earthquake strikes



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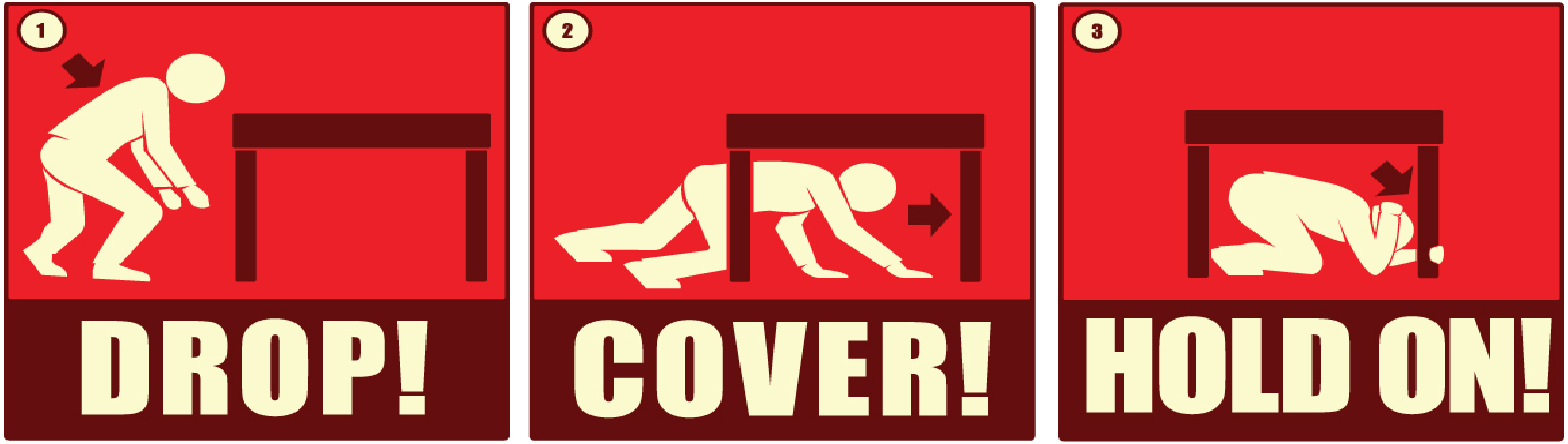
Most Common Protective Action Taken

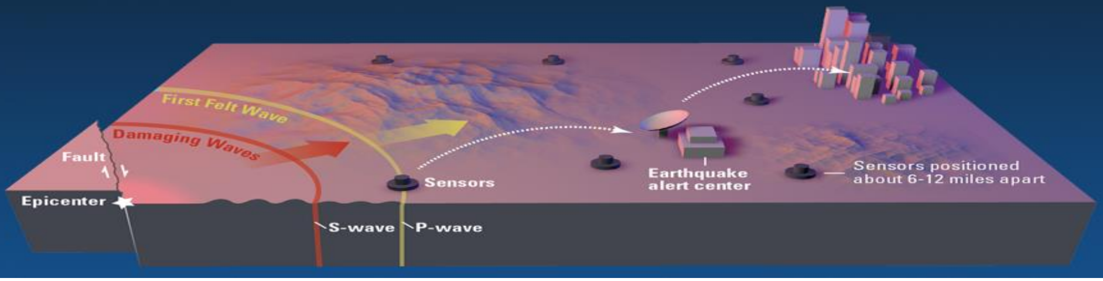
By People in the United States

We All Know What To Do in An Earthquake


1
DROP!
2
COVER!
3
HOLD ON!

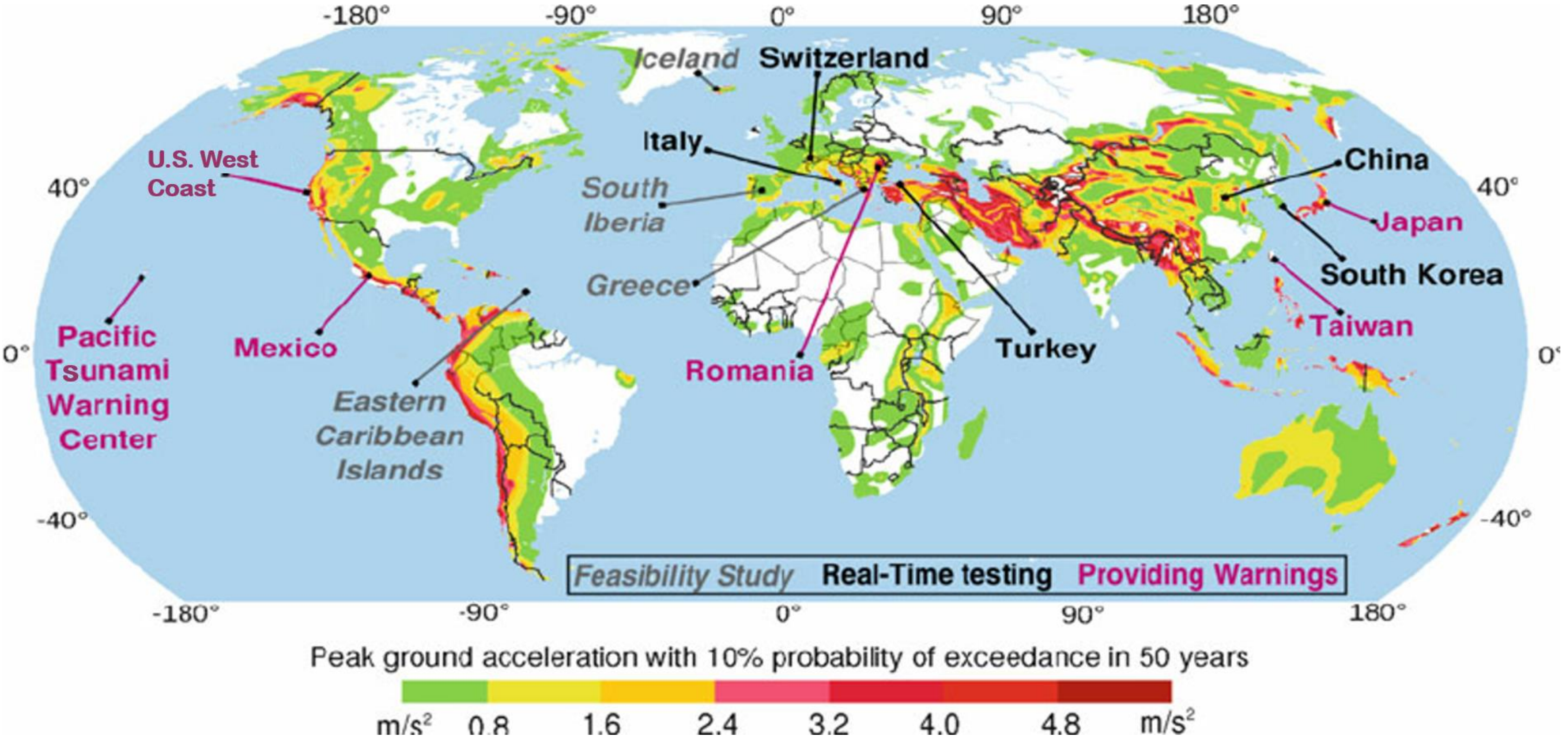
Mears Middle School in South Anchorage

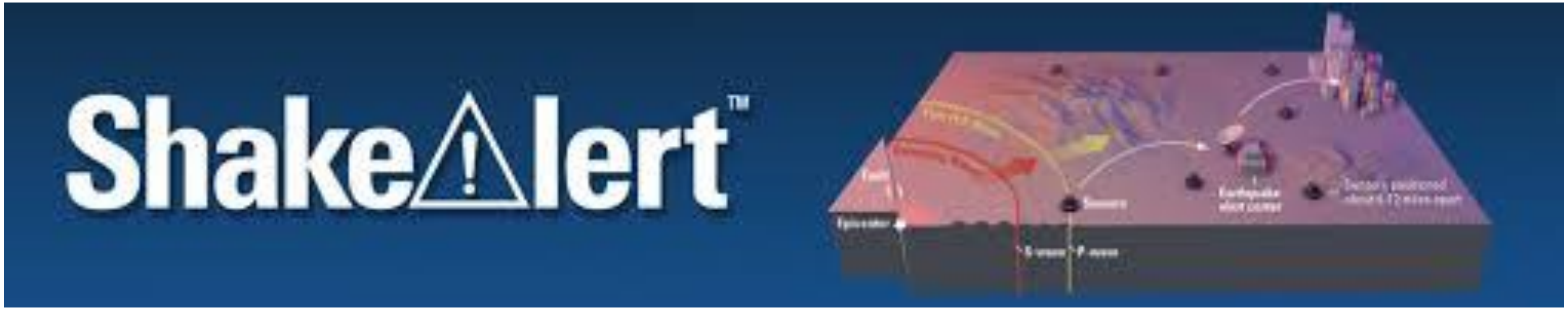
A magnitude 7.0 earthquake struck on Nov. 30, 2018, at 8:29 a.m.



Are There Earthquake Early Warning Systems Anywhere Else in the World?

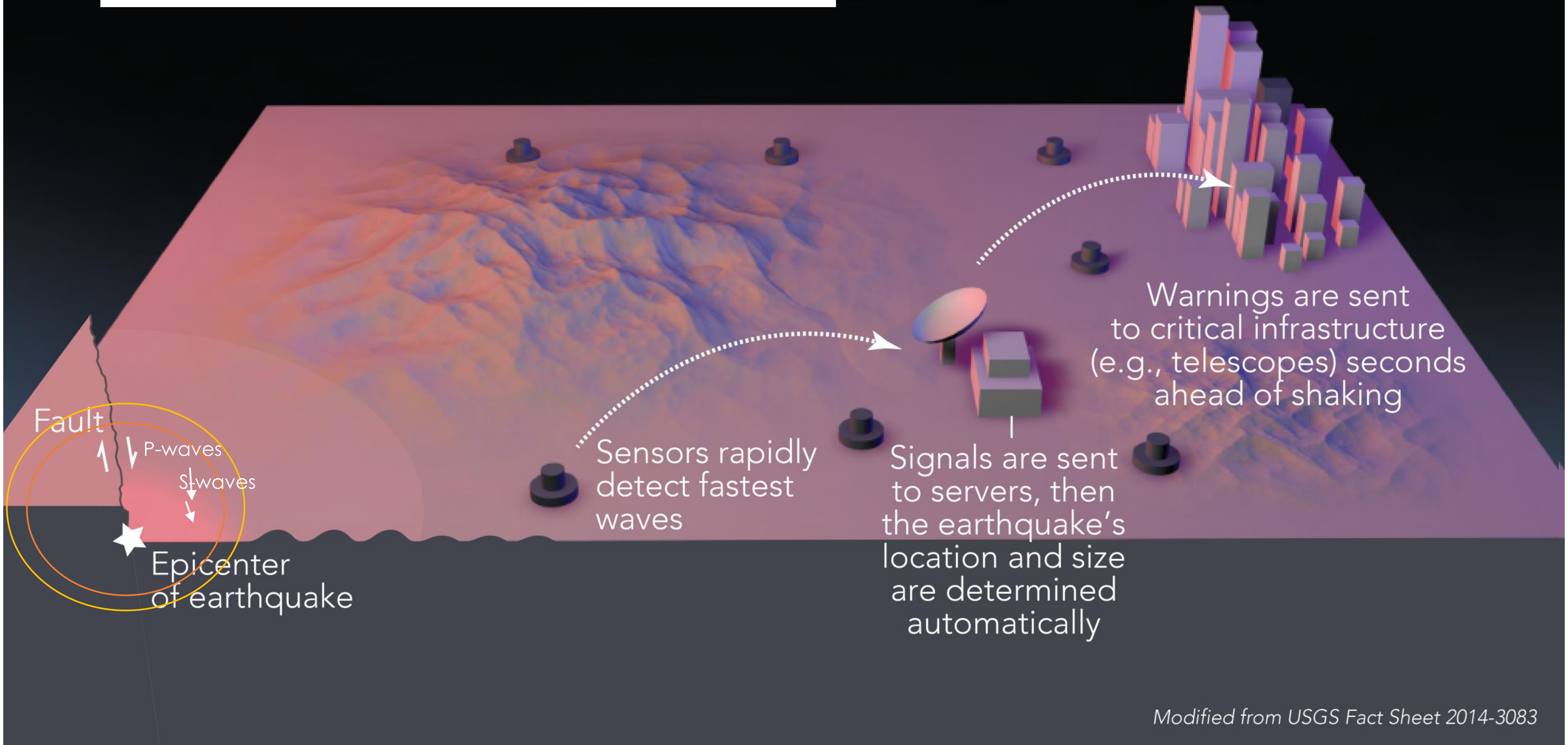
Worldwide Earthquake Early Warning Systems





So, How Does It Work?

ShakeAlert™



Sensors rapidly detect fastest waves

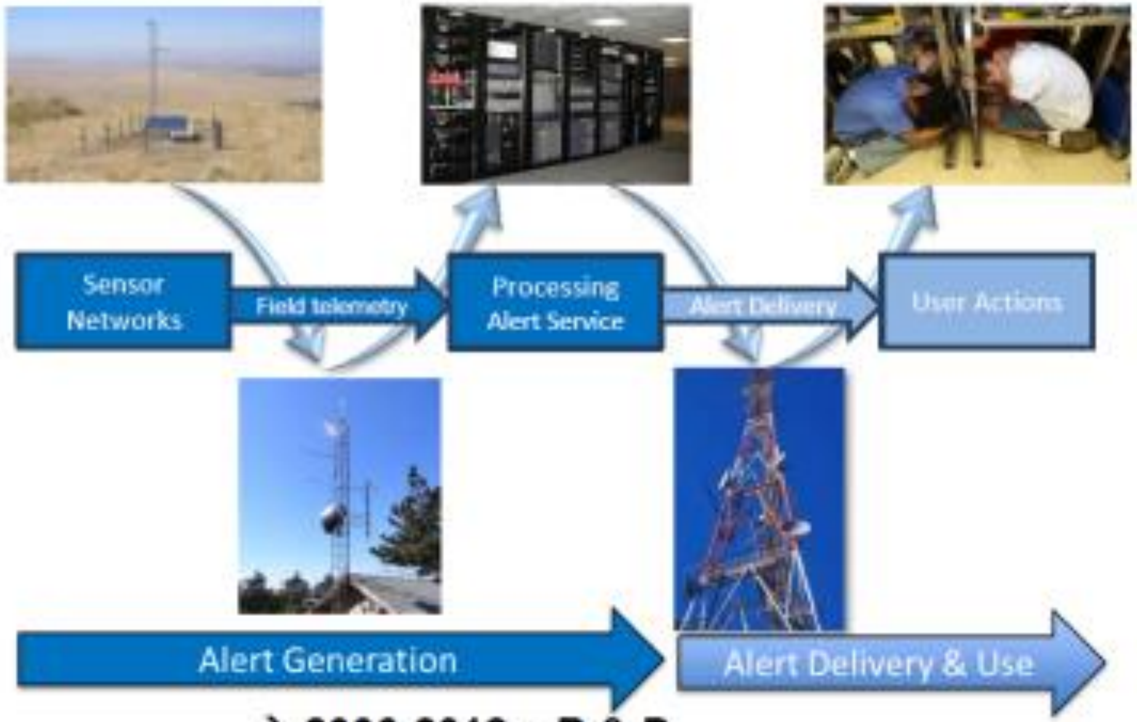
Signals are sent to servers, then the earthquake's location and size are determined automatically

Warnings are sent to critical infrastructure (e.g., telescopes) seconds ahead of shaking

Modified from USGS Fact Sheet 2014-3083

ShakeAlert

shakealert.org



Sensor Networks

Field telemetry

Processing Alert Service

Alert Delivery

User Actions

Alert Generation

Alert Delivery & Use

Road
To
EEW

→ 2006-2012 – R & D

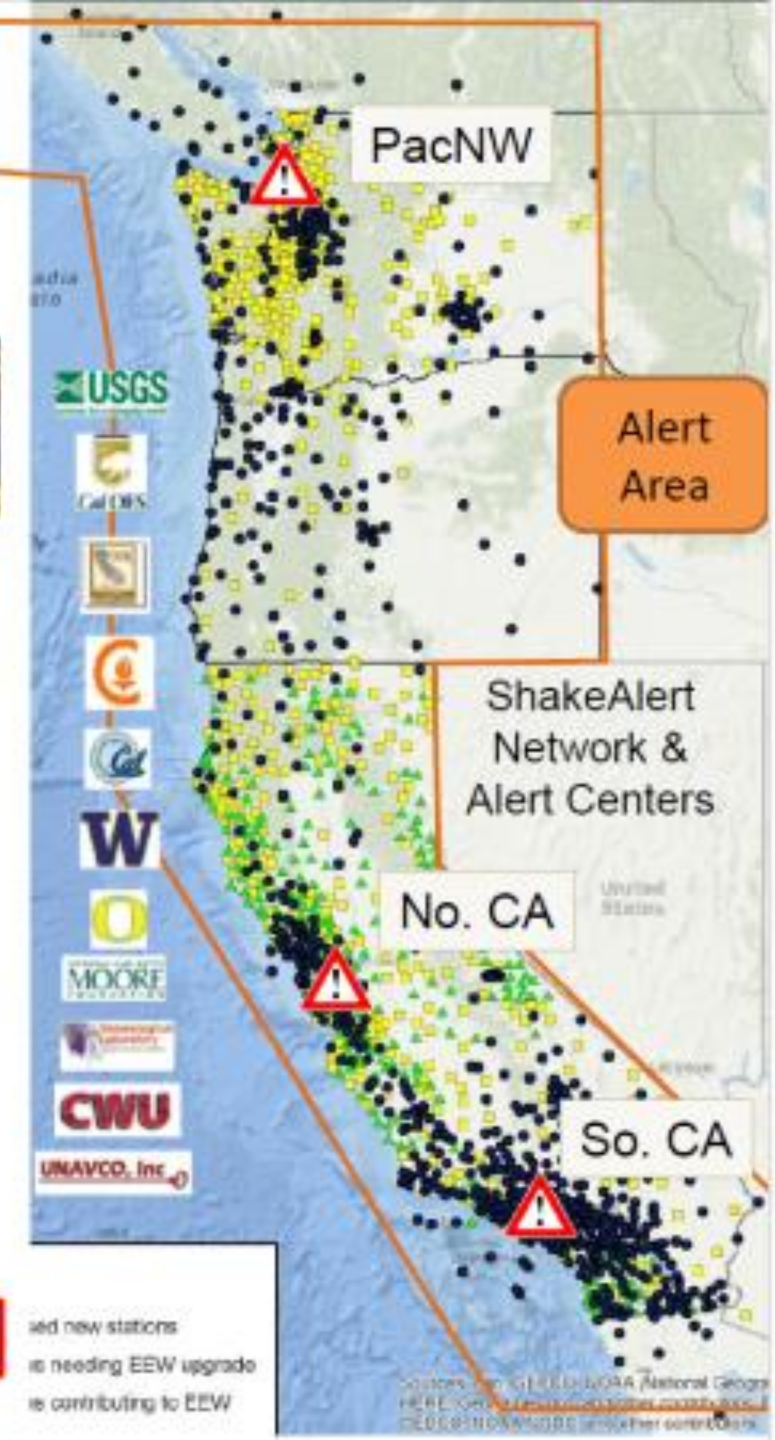
→ 2012 – Demo System

→ 2016 – CA Production Prototype

→ 2017 – Full West Coast Prototype

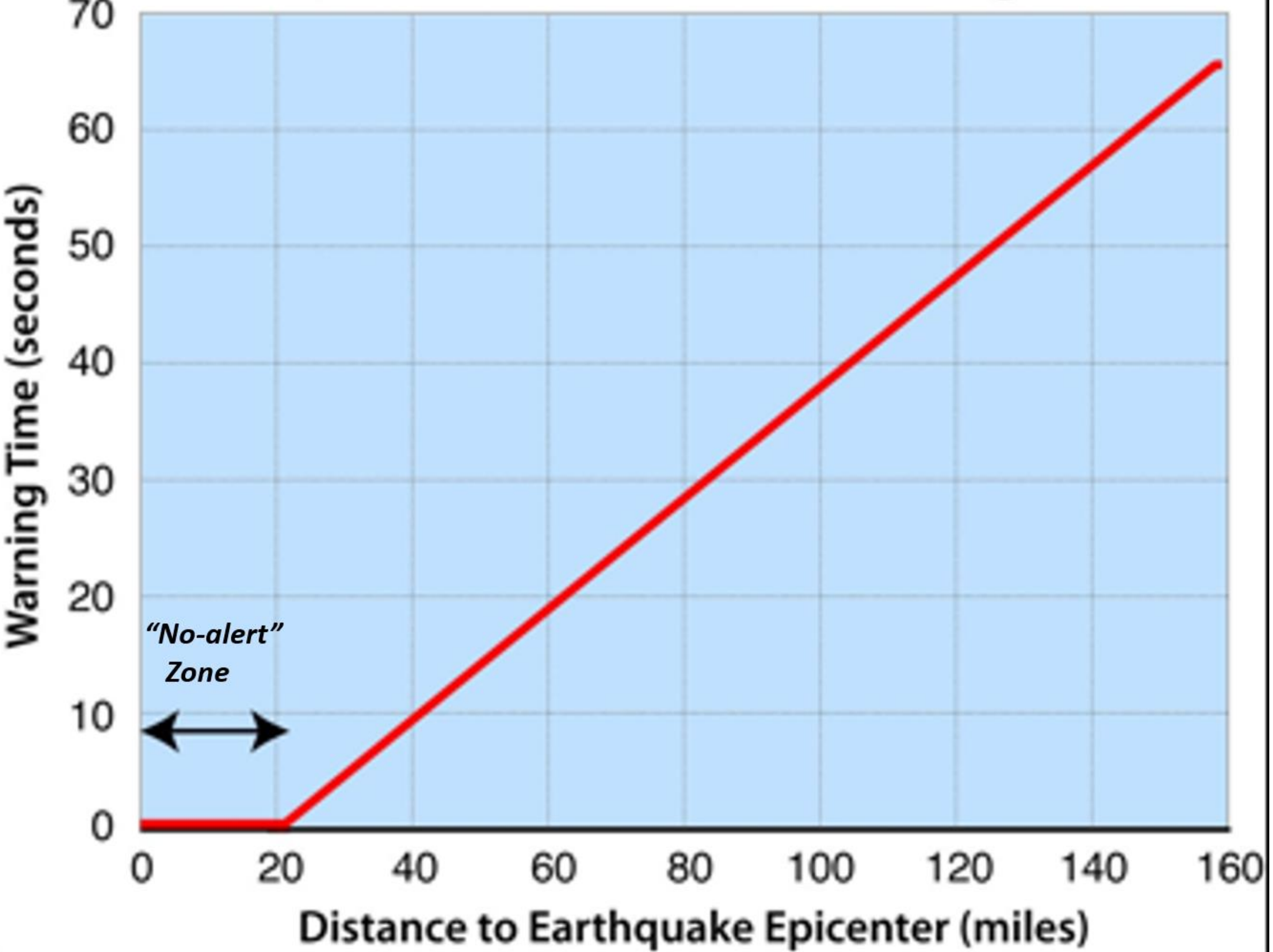
→ 2018 – Phase 1: Institutional use

→???? – Future phases to Full Operation



Pacific Northwest Seismic Network (PNSN)

- To monitor earthquake and volcanic activity across the Pacific Northwest, the ***University of Washington*** and the ***University of Oregon*** cooperatively operate the Pacific Northwest Seismic Network (PNSN).
- The PNSN is sponsored by the U.S. Geological Survey (USGS), the U.S. Department of Energy, the State of Washington, and the State of Oregon.
- Beginning in 1969 with five seismometers, ***the PNSN has grown to more than 300 seismograph stations distributed across the region and become the second largest seismic network in the United States.***



Warning Time Depends on Distance to Quake

(Assumes 10 seconds to issue warning)

What is Earthquake Early Warning (EEW)?

In the U.S., EEW is the combination of:

- **ShakeAlert system technology (Detect the Earthquake)**
- ***Recommended protective measures communicated to end users***
- **The outreach, education, training, and other risk reduction activities required to fully implement EEW**

Two Main User Categories

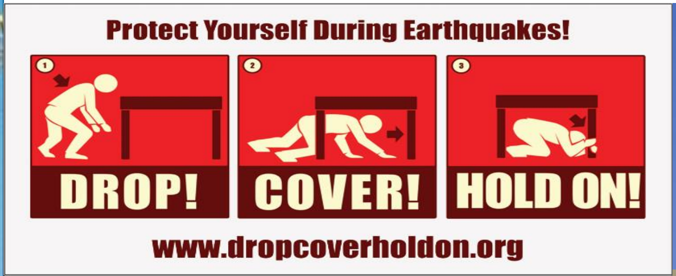
People

- Drop Cover Hold on
- Move away from hazardous areas
- Secure Delicate Procedures

Systems

- Slow/stop trains, traffic, aircraft
- Close valves, stop pumps machinery, processes
- Equipment to Safe Mode

Tyler Tobolt



Protect Yourself During Earthquakes!

1 DROP!

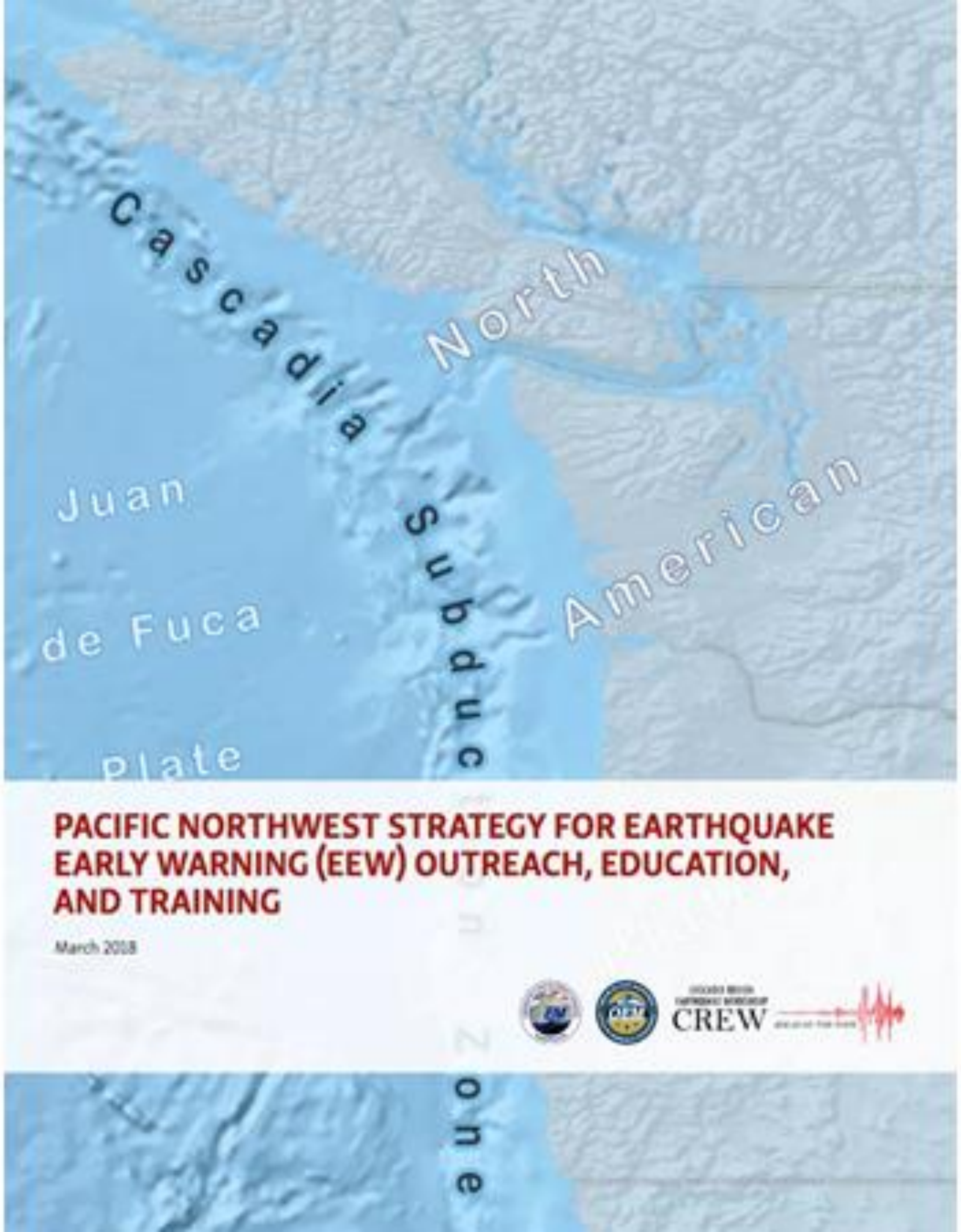
2 COVER!

3 HOLD ON!

www.dropcoverholdon.org

Sample Activity

Develop outreach materials that reflect consistent EEW guidance for coastal communities



PACIFIC NORTHWEST STRATEGY FOR EARTHQUAKE EARLY WARNING (EEW) OUTREACH, EDUCATION, AND TRAINING

March 2018

Strategy Development

Strategy Development led by:

- Cascadia Region Earthquake Workgroup (CREW)
- Oregon Office of Emergency Management
- Washington Emergency Management Division
- Nusura, Inc. (contractor support)

FEMA's National Earthquake Hazard Reduction Program (NEHRP) provided funding for the development of this strategy.

CASCADIA REGION
EARTHQUAKE WORKGROUP
CREW
AHEAD OF THE WAVE

Stakeholder Contributions to the Strategy

More than 100 partners and stakeholders contributed to the development of the strategy:

- **Local and tribal emergency managers**
- **Oregon and Washington state agencies**
- **School district officials**
- **Utility and lifeline providers**
- **Private industry partners**
- **Public Information Officers**
- **Preparedness coordinators**
- **Preparedness coordinators**
- **Systems and technology administrators**
- **Executives in the public safety community**
- **Hundreds of members from Oregon and Washington Community Emergency Response Teams (CERT)**

What Successful EEW Might Look Like

1. The ShakeAlert system adequately detected an earthquake and rapidly disseminated warnings to end users in potentially affected areas

2. The end users received the warnings and took the recommended protective measures

3. The receipt of the warning and resulting protective actions (individual and automated responses) enhanced public safety

Recommended Actions

- Gather data from EEW pilot users and synthesize the information so it is useful for EEW outreach, training, and education activities.
- Develop and refine EEW and ShakeAlert websites and branding, so that materials are consistent and identified as credible.
- Develop EEW preparedness education and training materials to support end user outreach to their audience(s) on recommended protective actions.
- Clearly define roles and responsibilities of federal, state, tribal, local, university, private sector, and other partners in the implementation of ShakeAlert and EEW.

- Define ShakeAlert EEW rollout milestones and metrics
  - ShakeAlert System and Technology
    - System saturation
    - SOPs
    - Staffing
    - False alarms

Gaps (continued)

ShakeAlert EEW Education and Training

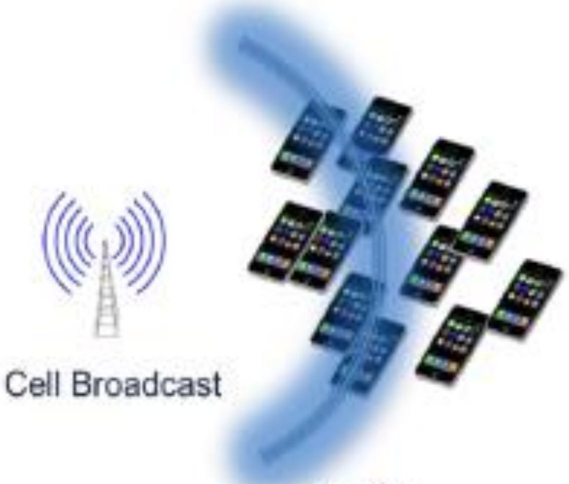
- Public awareness of EEW and protective actions
- Integration of EEW into ShakeOut, with a focus on schools
- Earthquake/EEW preparedness campaigns
- Public education
- First responder training

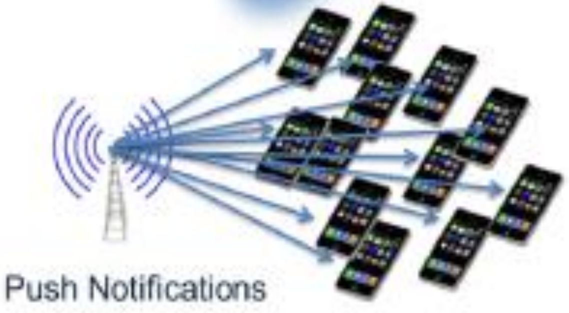
Gaps (continued)

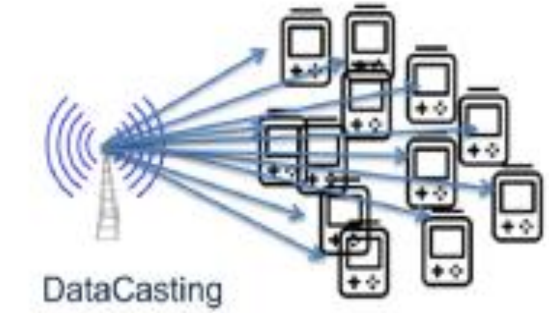
- ShakeAlert Dissemination
    - Mechanisms for alerting (e.g., WEA)
    - Tone
    - Message
    - Security
    - Staffing
    - SOPs
    - Training
    - Testing

Public Mass Alerting Technology

- Cell-broadcast IPAWS/WEA
  - Speed uncertain
  - No EEW-specific sound yet
- Cell apps, push notifications
  - Scalability, speed unknown
  - Someone must provide the service
- DataCasting – alert encoded in TV broadcast signal
  - Crude geotargetting
  - Requires special receiver


Cell Broadcast


Push Notifications


DataCasting

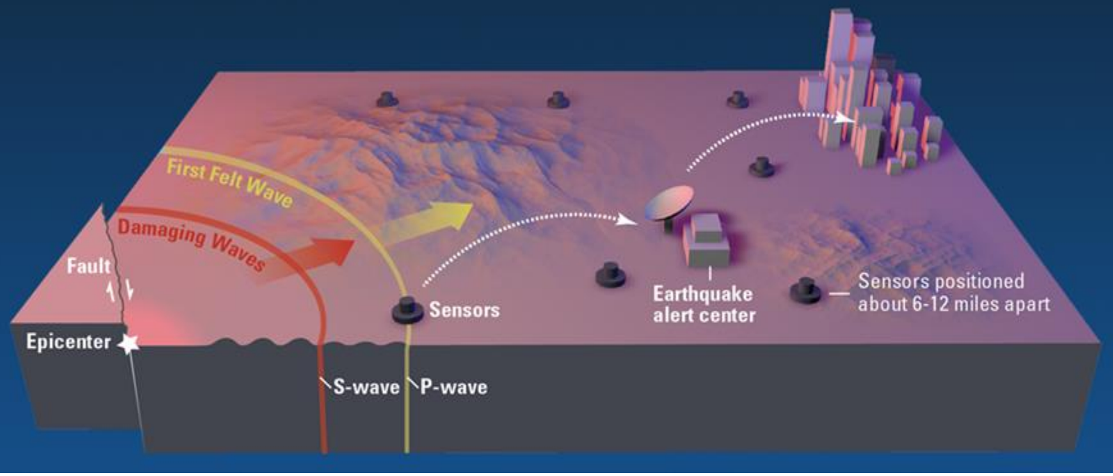
Phase 1 Rollout

- Rollout is limited by:
    - Funding to complete and operate the system
    - Sensor network is incomplete
    - Mass notification technologies are too slow
    - Need to provide information to users
- ShakeAlert began limited operations last year
- Several pilot delivery and use applications have begun operation including automated actions and limited internal alerting.

CASCADIA REGION EARTHQUAKE WORKGROUP
CREW

- Baseline Earthquake Early Warning Survey
    - Integrating research from Japan and New Zealand
- WA/EMD Pierce County Pilot Project
- Earthquake Intensity Public Education Toolkit
- 2019 Shakeout on October 17th at 10:17am
- Continue Phase 1 Rollout and begin Phase 2

ShakeAlert™



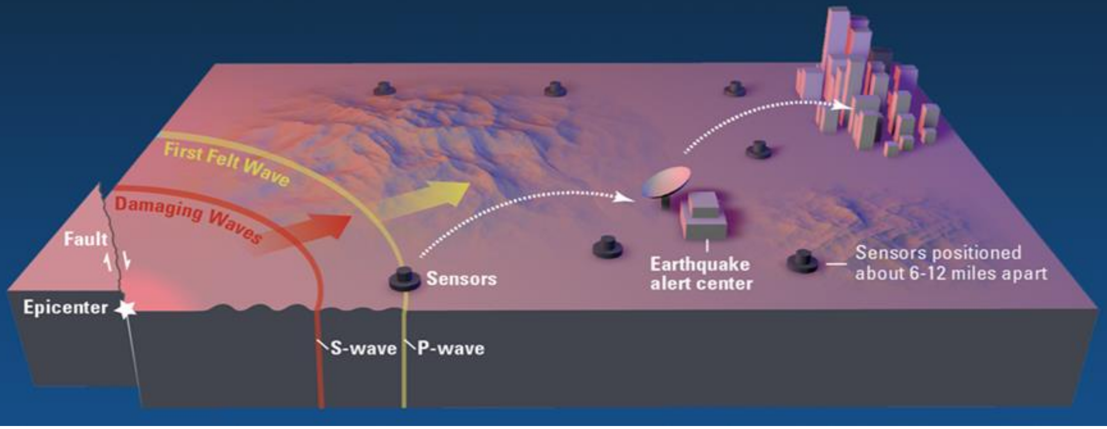
What Does This all Mean to Me ?

WE CAN NOT DO THIS ALONE.
WE NEED YOUR HELP.

- **We're looking for innovators in business and industry, in local government, schools, public and private enterprise and those wishing to be the early adopters of the ShakeAlert, Earthquake Early Warning System.**

- **Those desiring the unique opportunity to become one of the First 50, First 100 in Washington State to become Pilot Users of the ShakeAlert, Earthquake Early Warning System.**

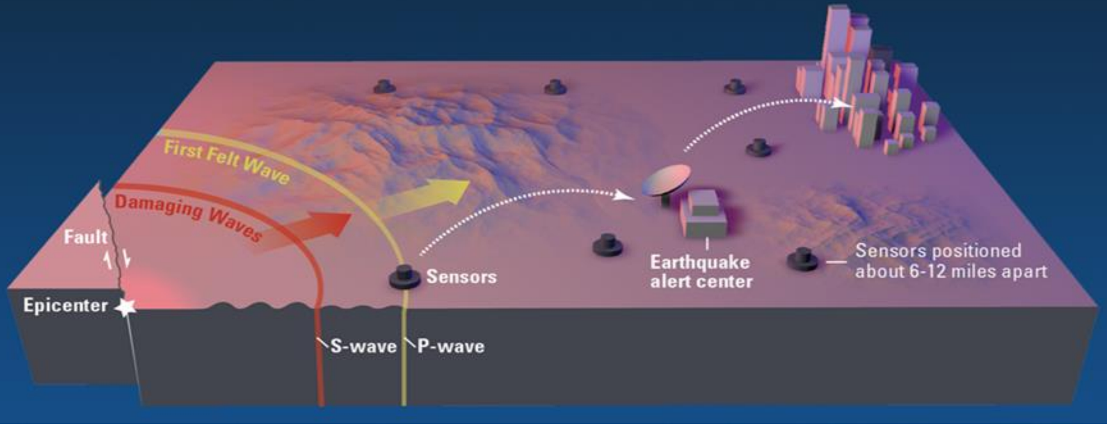
ShakeAlert™



How Much is it Going to Cost ??

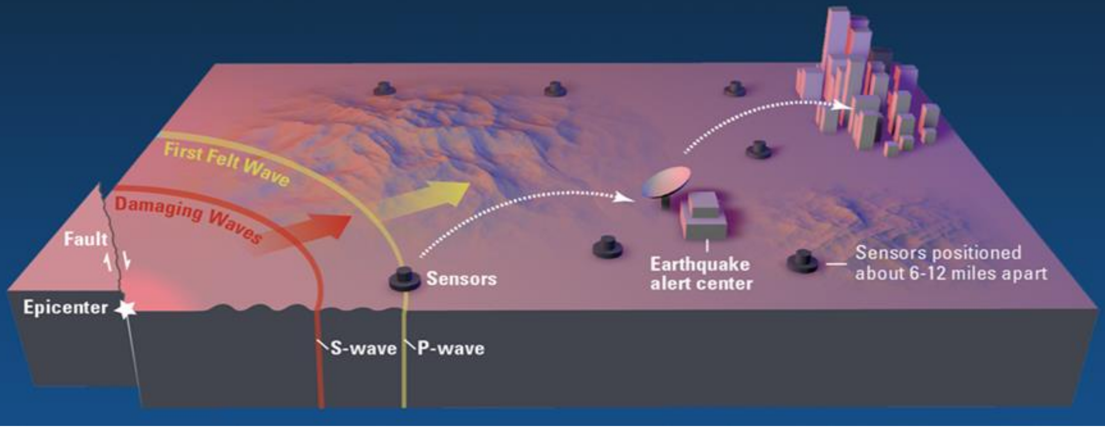
LET'S TALK ABOUT COST.

- There is NO COST TO PARTICIPATE as a Pilot User of the ShakeAlert Earthquake Early Warning System.
- Costs are individually dependent upon the specific project or projects you decide to undertake.
- There is NO TIME CONSTRAINT to complete all projects you decide you may wish to accomplish.



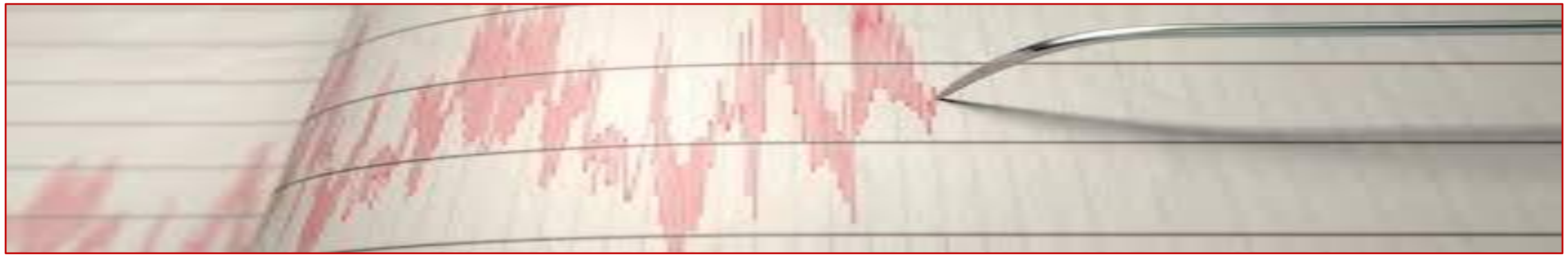
Will There Be Any Support ????

- **You'll be assigned someone to assist you along the way.**
- **A specific person you will be able to**
  - **Speak directly to, Meet with, and**
    - **who will help provide Guidance,**
    - **Tips, Advice and**
    - **Support *throughout* the process**



How Can We Participate???

ShakeAlert – Earthquake Early Warning (EEW)



MyShakeAlert.org

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Maximilian Dixon

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Bill Steele

PNSN, Director of Outreach & Information Services, wsteele@uw.edu (206) 685-5880

The Great Washington
ShakeOut
DROP!
COVER!
HOLD ON!

www.ShakeOut.org

October 17, 2019 at 10:17am

Join Us
for the
World's Largest
Earthquake Drill.
ShakeOut
www.shakeout.org

ShakeOut

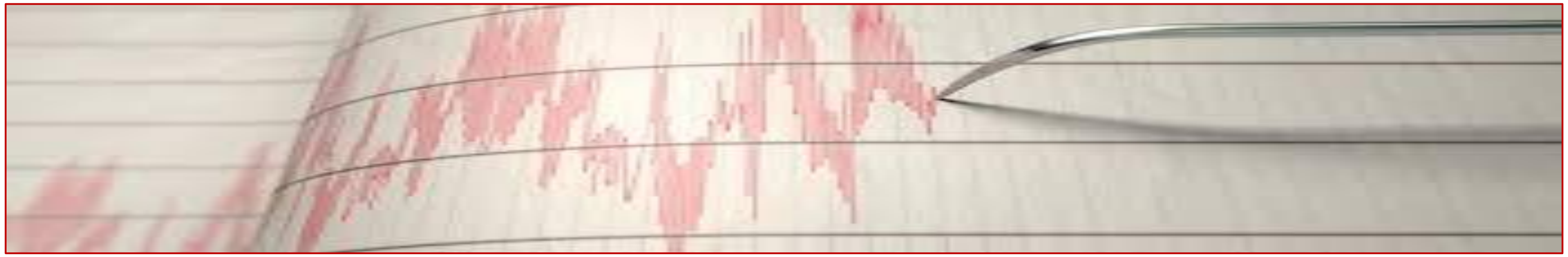
- Conduct EEW outreach in schools and use a test tone/message
- Inspire schools to develop pilot projects for 2019 ShakeOut

DROP!
COVER!
HOLD ON!

ANY
QUESTIONS
?
www.rekruitin.com
ReKruiTIn.com

FunnyAnimalSite.com

ShakeAlert – Earthquake Early Warning (EEW)



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October 17, 2019 at 10:17am